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MONETARY GRANTS AS PUBLIC POLICY IN EDUCATION: EVIDENCE FROM  
“ESCOLA NOTA DEZ” PRIZE IN BRAZIL

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## Monetary grants as public policy in education: Evidence from “Escola Nota Dez” prize in Brazil

### **Abstract**

We apply a regression discontinuity design to estimate the causal effects of offering monetary grants conditional on the school’s achievements. We use the evidence of 5<sup>th</sup>-grade elementary schools that received extra resources for the 2013 edition of the Escola Nota Dez prize, program implemented in the Brazilian state Ceará that yearly gives monetary grants to the best schools and worst public schools according to their rank in a standardized index. Although the atmosphere of competition and motivation created by the prize may impact positively the whole Ceará’s school network, as demonstrated by previous papers, our results indicate that the extra money offered as award and support is not effective to improve schools’ proficiencies in state and national evaluations when compared to other schools in Ceará.

**Keywords:** Monetary Grants; School Performance; Early Education; Brazil; Regression Discontinuity

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## 1. Introduction

This work project examines the innovative intervention Escola Nota Dez prize instituted in the Brazilian state Ceará. This project offers monetary grants to the best and worst public schools according to the classification in a standardized exam applied yearly to all the schools in the state. The literal translation for the name Escola Nota Dez would be “School Grade Ten”, referring to the maximum grade in the Brazilian 0-10 grade system, as a suggestion of the main objective of the program of improving schools’ performance in terms of literacy.

We apply the evidence of Escola Nota Dez to address the question related to the effectiveness of offering extra resources to schools as an instrument of public policy in education. The economic context where financial income is crucial for individuals and companies to succeed leads policymakers and other agents to believe and act based on the preconceived idea that investing more resources will always contribute to achieving better outcomes. The truth is this relationship is not so clear in some public policy matters and education is one of them, as we discuss later in the literature review. Certainly, this is an important question to answer since resources are limited, especially in developing countries, those more in need to accomplish improved results in education.

Although the Escola Nota Dez prize was created in 2009 for the 2<sup>nd</sup>-grade elementary schools, our analysis will focus on the 2013 edition of the intervention for the 5th grade, which was implemented in 2011. Every year, the program ranks Ceará’s schools based on the IDE (from the Portuguese term “Índice de Desempenho Escolar”, which means “School Performance Indicator”), and up to 150 schools with the highest IDE-5 (IDE for the 5th grade) receive a monetary grant as an award for their performance if they achieve more than 7.5 and comply with some eligibility rules. Alongside, the same number of eligible schools with the lowest grades in the IDE receive monetary grants as financial support. The structure of the Escola Nota Dez prize where the allocation of the treatment is based on a clear cutoff in an assignment variable allows the

investigation of the causal effects of the extra resources on the schools' performance by a valuable quasi-experimental method of policy evaluation, the Regression Discontinuity Design. As presented by Lee and Lemieux (2010), the regression discontinuity design is credible, transparent, and widely applicable, with lighter assumptions and stronger inferences when compared to other non-experimental approaches.

Some authors have compared schools in Ceará with similar schools in other Brazilian states, concluding for a positive effect of education policies in Ceará. I will focus on a comparison between Ceará schools, those that receive a monetary grant versus those that didn't receive it, and thus, I will be analyzing the specific effect of a monetary grant on schools' performance. My results don't speak about the overall effect of education policies in Ceará.

The rest of the paper proceeds as follows. Section 2 presents an overview of the context and structure of the Escola Nota Dez prize. Section 3 reviews the literature on the impact of extra resources on education as well as previous research related to Escola Nota Dez. Section 4 introduces the data structure of our estimation. Section 5 describes the empirical strategy. Section 6 presents the main results, and Section 7 discusses the findings and concludes.

## **2. Escola Nota Dez Prize**

The Brazilian state Ceará is an interesting case of success regarding primary education. Located in northeast Brazil, Ceará has approximately 9.1 million inhabitants (in 2019), the 8th largest population among the 27 Brazilian states, around 45% of those are living in the metropolitan area of the capital, Fortaleza. Although Ceará has historically suffered from problems related to drought and poverty, the state has attracted national and international acknowledgment for the good results of its private and public schools in national evaluations. Taking, for example, the performance on IDEB (Basic Education Development Index), the main indicator for public basic education in

Brazil, Ceará stood out nationally in 2017 for achieving 6.1 (in the Brazilian 0-10 grade scale) for initial years of Elementary school, accomplishing the national goal for 2021 of 6.0. Even more impressive is the number of 82 schools out of the 100-best ranked in IDEB 2017 is from Ceará.

Recent research highlights the Escola Nota Dez prize as an important contribution to Ceará's improvement in education, being part of a set of policies implemented by the state department of education of Ceará called PAIC (an acronym for "Programa Alfabetização na Idade Certa", which means Literacy at the Right Age Program). The PAIC is an example of a school accountability initiative since its main intervention is the establishment of clear goals of educational indicators to be achieved by municipalities and schools. The Escola Nota Dez award is the major incentive instrument of the PAIC, providing competition and cooperation between schools and municipalities, as well as monetary resources as tools to encourage and support educational improvements.

The Escola Nota Dez was instituted in 2009 focusing exclusively on the results of the 2nd grade at the beginning, but it was reformulated in 2011 to include 5th grade and then in 2015 to include 9th grade as well. The program provides financial and pedagogical support to the best and worst public schools according to the School Performance Indicator – referred to as IDE (from Portuguese term "Índice de Desempenho Escolar").

The IDE is a 0 -10 score calculated based on the proficiencies in Portuguese and Math from SPAECE (1) – Portuguese acronym for Basic Education Permanent Evaluation System of Ceará, a census and external evaluation promoted every year since 1992 for students on 2nd, 5th and 9th grade of public elementary schools. However, the Escola Nota Dez uses, in fact, the IDE-Alfa, IDE-5, and IDE-9, the indicators for 2nd, 5th and 9th grade respectively, computed using the SPAECE grades, the percentage of participation in the exam and an adjustment factor for universal learning at the respective grade. Those components are strategically included to discourage schools

from informally select students to improve performance. Appendix A offers more details of the IDE calculation.

The Escola Nota Dez Prize rewards each year up to 150 public schools on each of the three grades considered with the better performance in the IDE with 2 000.00 BRL per number of students evaluated. As there are some eligibility rules to receive the prize, the number of awarded schools might be lower than 150, which is the case of the 2013 edition, when only 95 schools were awarded for the 5th grade (the grade focused in this paper). As conditions to be awarded, schools should obtain IDE-5 higher than 7.5, besides having at least 20 students enrolled in 5th grade and at least 90% of those students evaluated on SPAECE and being part of municipality where at least 70% of students are in the “desirable” level of literacy (the levels of classification for literacy are Illiterate, Incomplete Literacy, Intermediate, Satisfactory and Desirable). Besides, the schools cannot have received an award in the previous year, which means schools awarded in 2012 were not eligible for the prize in 2013.

On the other hand, the Escola Nota Dez also offers financial support of 1 000.00 BRL for each student evaluated to the schools with the lowest IDE-5, in the same number of the awarded ones. Thus, 95 schools were supported for the 2013 edition of the prize. As a condition to receive support, schools need to have at least 20 students enrolled in 5th grade and at least 90% of those students evaluated on SPAECE and cannot have received support in the previous year.

Another dimension of the Escola Nota Dez prize is that each awarded school is matched to a supported one and the pair should work together in pedagogical-technical cooperation for the following 2 years focusing on exchanging practices and improving their achievement. However, we do not consider this aspect in our analysis since the absence of information about visits and activities developed by the partnership makes it hard to distinguish the pairs where the collaboration happened from the others where it did not.

It is important to mention that the financial monetary grant is delivered in two installments. For the best schools, the monetary prize is given in the first installment of 75% of the total prize one year after the evaluation and the remaining 25% 2 years later, depending on the proof of the pedagogical partnership, the maintenance or improvement on their IDE performance, the achievement of a minimum IDE by the supported school of the pair, which is 5.0 on IDE-5, and the proper accountability of the first payment. For the supported schools, the resources are provided in installments of 50% each, being the second part conditional to the execution of the cooperation, the achievement of minimum 5.0 on IDE-5, and proper accountability of the first payment. Table 1 is presented for a better understanding of Escola Nota Dez's timeline.

Table 1: Calendar of one cycle of Escola Nota Dez Prize

	March	June	July	August	October	November	December
Year 0						1st SPAECE Evaluation	
Year 1	Publication of SPAECE results	Official Event Prize	Announcement to supported schools	Announcement of the partnerships		2 <sup>nd</sup> SPAECE Evaluation	
Year 2						3 <sup>rd</sup> SPAECE Evaluation	
Year 3						4 <sup>th</sup> SPAECE Evaluation	
						2nd installment of Award/Support	

Notes: Free translation from "Accountability in education: impacts of the escola nota dez award on Ceará's public education system"(CORREA, 2018)

Every year, the Brazilian Ministry of Education (MEC) publicizes a minimal value per student that must be invested by the states in Basic Education. This minimal cost per student is a good benchmark to show how the financial value per student, the award of 2000 BRL, and financial support of 1000 BRL, offered by Escola Nota Dez prize is indeed very attractive. Table 2 shows this relationship, where we can see that schools that received the 1st installment of the award in 2014 would have 66% more money in comparison to the value determined nationally, and 88% more if they received the 2nd installment as well. Considering financial support, it would be 22% extra money to be spent by the school, and 44% if they obtain both parts of the payment.

Table 2: Financial Award/Support as percentage of Minimal National Value

Year	Minimal Value	Award % (2000 BRL)		Support % (1000 BRL)	
		Both parts	Only 1st part	Both parts	Only 1st part
2011	1 729.28 BRL	116%	87%	58%	29%
2012	2 091.37 BRL	96%	72%	48%	24%
2013	2 022.51 BRL	99%	74%	49%	25%
2014	2 285.57 BRL	88%	66%	44%	22%
2015	2 545.31 BRL	79%	59%	39%	20%
2016	2 739.00 BRL	73%	55%	37%	18%
2017	2 875.03 BRL	70%	52%	35%	17%

Notes: Minimal value is stipulated based on the estimated collections to FUNDEB – the national fund for maintenance and development of basic education. Source: Author's elaboration based on data from <https://www.fnnde.gov.br>

The financial fund received by the schools should be invested exclusively in their didactic-pedagogical and human resources, equipment, and facilities. The state educational department determines the maximum percentage of 1st and 2nd payment for awarded and supported schools that should be spent in each of three components: gratification of professors and other professionals responsible for the learning of the grade in the year evaluated (item I); acquisition of features that contribute to improving quality of teaching and learning (item II) and development of the Technical Pedagogical Cooperation (item III). Table 3 shows the respective percentages

Table 3: Maximum spending by component

		Award		Support	
		1st installment	2nd installment	1st installment	2nd installment
I	Gratification of professors and other professionals	20%	30%	0%	30%
II	Features to improve education and student learning	70%	100%	90%	100%
III	Technical Pedagogical Cooperation	10%	0%	10%	0%

Notes: Author's Elaboration. Source: "Manual de orientações para elaboração, execução e prestação de contas do plano de aplicação dos recursos financeiros do prêmio escola nota dez" (SEDUC, 2015)

### 3. Literature Review

There is no consensus in the literature about the effects of monetary transfers in educational achievements. The skepticism about the relationship between financial resources and student achievement is present in Hanushek (2008), where the author argues that only around a quarter of the literature studying this question have shown positive and significant effects. Furthermore, he



wonders about the accuracy of those results, claiming that “studies involving pupil spending have tended to be the lowest-quality studies” (p.03). Hanushek already had discussed in previous studies (1981, 1989) how complicated estimating the impact of spending in schools can be, given the many possibilities of endogeneity and the difficulty to isolate this impact from other features, such as the family background. He also points out the complexity of the structure and incentives faced by decision-makers as a likely cause for this apparent inefficiency of resources on educational achievements. Glewwe et al. (2011) reinforce this discussion by presenting large research analyzing several studies published between 1990 and 2010 on how schools’ resources impact educational outcomes. According to the papers based on randomized trials and those considered by the authors as “high quality” studies, investment in school equipment such as textbooks, tables, chairs, computers, etc., seems to have a timid positive, not significant, or inconclusive impact on student learning. Similar conclusion is found by McEwan (2015), in his robust overview of 77 randomized experiments on policies to improve primary schools in developing countries, monetary grant seems to have no impact on improving learning: the mean of the estimates of the four experiments about monetary grants to schools reviewed by McEwan is very low and statistically equal to zero.

On the other hand, the latest decades brought significant advances in empirical strategies and better data for the research on additional resources in education (Gibbons and McNally, 2013). Hence, several papers are using a robust methodology (including real or quasi-experimental methods) presenting positive results of monetary investment or resources-related factors. A recent contribution to this literature is Gibbons et al. (2018). This article uses the variety of funds received by schools among different Local Educational Authorities (LEA) in England to analyze the impact of spending on the attainment of urban schools. The method used is a discontinuity regression design, where schools are matched by geographical location and free meals entitlement and

explores the discontinuity of grants on the border of the LEA. Their analysis has shown a significant impact of spending on urban state school's achievement. Previously, Holmlund et al. (2013) aimed to answer the question "Does money matter for schools?" using this same context and data to estimate an Educational Production Function. They also found a consistent positive and significant effect of school expenditure on the achievement of primary school students in national tests, especially those economically disadvantaged. Yet, in the context of developing countries, Carneiro et al. (2015) studied the effectiveness of additional resources in education by a randomized experiment in a school grants program in Senegal, they found large positive impact in students achievements, especially for early grades and in schools that invested more in human resources than in physical resources for education.

As mentioned before, regardless of the rough environment of drought and poverty, Ceará has been acknowledged for great achievements when it comes to education, which has motivated several studies in the last decades. Some of them investigate the contribution of structural reforms such as switching elementary schools to local administration (Neto et al., 2009) and including educational indicators as criteria for the transfer of state funds to municipalities (Carneiro and Irffi, 2017). Yet, PAIC ("Literacy at the Right Age Program") and its main incentive instrument, Escola Nota Dez prize, is a predominant subject in the literature, being seen by many as the major responsible for the notable progress of the state of Ceará in the early grades of basic education.

Marques et al. (2009) present a picture of the context that prompted the implementation of PAIC in 2006. Analyzing literacy skills of 2nd-grade students from 55 municipalities in 2006, the authors observed that only 38% could write and 40% could read a simple text and only 33% could understand what they were reading.

One of the earliest evaluations of PAIC, Lavor, and Arraes (2014), constructed a counterfactual trajectory for Ceará state from 2005 to 2011 balancing Prova Brasil's average score

and control variables of the other Brazilian states by a synthetic control approach. They found a large positive impact: the average Portuguese proficiency with PAIC grew 11 points, while it would be just 5.5 points in the counterfactual.

PAIC was also the research object of Costa and Carnoy (2014). They used a triple difference-in-difference method where students of early grades treated by the project were compared to older students not treated by the project and to students from border states. The estimated impact of the program was between 0.7 and 0.1 SDs for Portuguese and 0.14 and 0.18 SDs for Math. On the other hand, Karminski et al. (2017), focusing on the perspective of effects of PAIC on equity within schools, conclude that the program improved equity, especially in those schools with more disadvantaged students. They used difference-in-differences, using 5<sup>th</sup>-grade students of other northeast states as a control group, to estimate the impact of PAIC in the probability that a given student achieves the adequate level in Prova Brasil's Portuguese evaluation.

Considering the literature evaluating specifically Escola Nota Dez prize, Koslinski et al. (2017) do a deep analysis on the project's first years of implementation in the 2nd grade (2009, 2010 and 2011) as evidence on educational indicators use (IDE-Alfa in this context) for school accountability. They used propensity score matching and multiple regressions to estimate the impact on performance in SPAECE and Prova Brasil, inequality, and participation rate in external evaluations. They have 4 groups for comparison: matched schools for the award, matched schools for support, not-matched schools close to awarded schools, and not-matched schools close to supported ones. For the award schools, they obtained average SPAECE-Alfa higher than the control group in 22 points. They also had greater performance in Prova Brasil, which indicates that the implementation of the program for 2nd grade affects other grades – since Prova Brasil evaluates 5th grade. Moreover, those schools matched to the awarded ones by the propensity score matching had higher average proficiencies than schools that were not matched but are geographically close

to award schools, what corroborates the hypothesis that Escola Nota Dez has also impact in the schools with more probability to receive the prize even if they do not, probably a result of accountability and competition mechanisms. Against the author's expectation, the award reduced the inequality between awarded schools and their paired peers. Despite the positive findings for the awarded schools, the program seemed to have no impact on the supported schools.

Carneiro (2018) also evaluated Escola Nota Dez under the point of view of school accountability. The analysis is based on a difference-in-difference approach (weighted in some baseline characteristics) where awarded and supported schools for 2nd and 5th grade are compared to 3 different controls groups: (i) all schools from other Brazilian states (except those with similar accountability programs to avoid noise); (ii) all schools from other states of Brazilian northeast (except those with similar accountability programs); and (iii) other schools from Ceará that were not awarded or supported. The outcomes variables are student flow indicators and Math and Portuguese proficiencies in Prova Brasil 5th grade 2007 to 2015. Considering the results for performance, Carneiro found that supported schools for 2nd or 5th grade had better results in Math and Portuguese Prova Brasil than similar schools from other states in Brazil and Northeast, but the performance was worse off when compared to other Ceará's schools for both grades, which may be a consequence of the selection bias of the structure of the assignment for support. Regarding the awarded schools, even greater outcomes were found for awarded schools in 2nd and 5th grade in comparison to all three control groups.

One of the most recent and thorough studies in this context, Correa (2018) discusses accountability in education using Escola Nota Dez Award as empirical evidence. Correa uses data from SPAECE and Prova Brasil to estimate the impact in the proficiencies and inequality of the 5th-grade prize at the school level based on a Regression Discontinuity Design. A regression discontinuity was performed for each year from 2011 to 2014 for awarded and supported schools

with SPAECE grades, Prova Brasil grades, and SPAECE SDs as outcomes. Summarizing his results, the project had a positive impact on SPAECE and Prova Brasil proficiencies for awarded schools mainly in the year 0 (year of evaluation for the prize) in comparison to year -1 (a year before of evaluation for the prize) and, for supported schools in the year 2. In the other years, the impact seems to be negative in the Prova Brasil for the award, and modestly positive for supported ones. In terms of equity, the evidence shows a negative impact on award schools in year -1 and positive for supported in year 2.

Those results are in coherence with the author's hypothesis about how the prize affects the school's agents. According to Correa, Escola Nota Dez would influence the best schools in a moment before the prize by the effort in the competition to win the award, and the possible improvements in the following years could come from the award's symbolic resources (public recognition of achievements might motivate them to dedicate even more) and material resources (investment in the school and gratification of the team might improve outcome). In parallel, the effects over those schools that receive support are after the compensation: their acknowledgment as "bad" schools may motivate them to change the condition (even though the author does not discard that may have a negative impact) and that good application of the resources may improve learning.

#### **4. Data Structure**

Our empirical analysis will be based on data from 4 different sources: SPAECE, Prova Brasil/SAEB, School Census, and SEDUC-CE publications (official information from Ceará's Education Secretary).

The SPAECE is a census and external exams promoted every year by Ceará state that evaluates Math and Portuguese proficiency of students on 2nd, 5th and 9th grades of public elementary schools. Those proficiencies are on a 0-500 scale and are used to calculate the School

Performance Index (IDE), 0-10 assignment variable for the Escola Nota Dez Prize. Prova Brazil and SAEB (National Basic Education Assessment System) are large scale diagnostic assessments developed by the Brazilian Education Ministry. They evaluate students in the 5th and 9th grade by Math and Portuguese standardized tests and socioeconomic questionnaires. Since 1990 SAEB examines a representative sample every two years, but the evaluation became a census (only for schools with more than 20 students enrolled) in 2007 with the Prova Brazil creation. Since then, Prova Brasil and SAEB are applied together every odd year. Brazilian School Census annually collects information about infrastructure, managers, classes, students, and teachers in the classroom of all Brazilian basic education schools. Finally, the list of awarded and supported schools by the Escola Nota Dez Prize is publicized yearly by the Ceará's Education Secretary, SEDUC-CE.

Our estimation will be focused on the awarded and supported schools for the 5th-grade evaluation in 2013. This choice is related to the fact that Prova Brasil is not applied for 2nd grade, besides, as the Escola Nota Dez program was implemented to 5th grade in 2011, the year 2013 gives us a good set of Prova Brasil's edition before (2007, 2009 and 2011) and after the prize (2013, 2015 and 2017). The Math and Portuguese proficiencies in Prova Brasil and SPAECE are our outcomes variables. A set of descriptive variables of 2013 as well as previous proficiencies and previous contributions will be included as baseline characteristics.

The original database included 4,012 schools that participated in SPAECE in 2013, between them 95 were awarded and 95 supported. However, it is important to consider that there are some conditions for the schools to be eligible for the prize: they must have at least 20 students enrolled in the 5th grade, at least 90% of those students must be evaluated on SPAECE and schools must not have received a contribution in the previous year. Besides, for receiving the award, there is an additional condition of being part of a municipality where at least 70% of students are in the "desirable" level of literacy. Applying those restrictions, we find that 1906 schools were eligible

for the support in 2013 and 640 schools were eligible for the award. Also, schools that were awarded or supported in 2014 were dropped from the dataset in our analysis, since they received the money in 2015 and it could compromise our estimation of the monetary grant effect on the schools for 2013 edition. Thus, in the end, the dataset is composed of 558 schools in the award sample and 1749 schools in the support sample.

Table 4 reports the mean and standard deviation for some variables for the full data, the final sample for the award, and the final sample for the support.

Table 4: Descriptive statistics

	Full data N = 4,012	Award Sample		Support Sample	
		Yes (N = 95)	No (N = 463)	Yes (N = 95)	No (N = 1624)
Eligibility Conditions					
Number of students enrolled in 5th grade	31 (32.01)	47 (37.72)	44 (26.98)	44 (27.58)	52 (34.76)
Participation rate in SPAECE	0.98 (0.06)	0.99 (0.02)	0.99 (0.02)	0.98 (0.03)	0.99 (0.02)
% students in desirable level in the city	0.18 (0.33)	0.93 (0.06)	0.81 (0.09)	0.53 (0.13)	0.62 (0.19)
Flow Indicators					
Age/grade distortion	0.30 (0.16)	0.17 (0.11)	0.25 (0.13)	0.34 (0.14)	0.28 (0.14)
Dropout rate	0.01 (0.04)	0.00 (0.00)	0.01 (0.02)	0.02 (0.03)	0.01 (0.02)
Failure rate 5th grade	0.05 (0.08)	0.01 (0.02)	0.05 (0.07)	0.09 (0.08)	0.06 (0.07)
Baseline Variables					
Average Socioeconomic Index	41.56 (3.50)	41.31 (2.76)	41.12 (3.28)	40.96 (2.36)	42.41 (3.29)
Urban area	0.38 (0.49)	0.60 (0.49)	0.63 (0.48)	0.52 (0.50)	0.68 (0.47)
% Male students	0.53 (0.05)	0.52 (0.04)	0.53 (0.04)	0.54 (0.04)	0.53 (0.03)
% Brown students	0.59 (0.22)	0.55 (0.22)	0.59 (0.23)	0.60 (0.22)	0.58 (0.21)
% White students	0.14 (0.11)	0.15 (0.13)	0.15 (0.11)	0.10 (0.08)	0.14 (0.10)
% Teachers with Tertiary Education	0.72 (0.26)	0.76 (0.21)	0.73 (0.21)	0.75 (0.20)	0.78 (0.21)

Notes: Author's elaboration. Table reports means and standard deviation based on data from SPAECE, Scholar Census, and SAEB.

Related to the eligibility rules, we see that while in 2013 the Ceará's schools have in average 31 students enrolled in 5th, this number is much higher for the schools eligible for the award and support, which reflects the fact that only 51% of the full dataset fulfilled this condition. The

participation rate is already quite high for all the schools, which may be evidence that the inclusion of this indicator in the calculus of IDE had worked to avoid the selection of students for the evaluation. The third row shows that the percentage of students in the desirable level of literacy in the city is a very strict condition; the sample of eligible for the award is approximately only a third of the number of eligible for the support. In fact, out of the 95 awarded schools in 2013, 24 of them come from Sobral, a city nationally recognized for the quality of the public schools. Out of the 184 municipalities in Ceará, 37 cities had some schools receiving the award for SPAECE 2013, 47 cities had received some support, and no city had simultaneously received award and support.

The flow indicators suggest that the awarded schools are in average better off than the dataset groups in this matter: the age/grade distortion was approximately the half of the overall average, the dropout rate is statistically zero and the failure rate only 1% against the Ceará's average of 5%. The opposite seems true for the supported ones since they higher flow indicators than all the other groups. Those results are somehow expected given the prize is based on proficiencies and they are usually found to be negatively correlated to flow indicators by the literature.

The average socioeconomic index is an indicator based on the student's answer to the SAEB context survey. The average socioeconomic index in the interval (40,50] is classified as medium-low socioeconomic level (Level III), which is the case of the average level of the general Ceará's schools and subgroups. At this level, students had have indicated that they have elementary goods and complementary goods (such as color television, paid TV, fixed and mobile telephone, internet access, vacuum cleaner, car, computes, etc.); they do not hire a monthly or daily maid; the monthly household income is between 1 and 1.5 minimum wages, and their parents (or guardians) have completed elementary school or are attending that level of education.



Furthermore, while we observe that most of the schools in Ceará were in a rural area in 2013, more than 60% of the schools in the award sample were in urban areas. In the case of the supported schools, only 52% were urban. The fact that most of the eligible schools were in urban areas comes from the eligibility condition of at least 20 students enrolled in 5th grade, the average for Ceará's rural schools is 15 enrolled students in the meantime the average for urban schools is 56 students.

Regarding gender and ethnicity, boys are slightly more than half of the students for all the datasets and around 60% identified themselves as brown, the term in Brazilian Portuguese is "pardo", which is used to refer to the Brazilians with varied ethnic backgrounds. According to IBGE, 43.1% of the Brazilian population was identified as "Pardo" in the 2010's national census.

The statistics for the variable percentage of teachers with tertiary education emphasizes a weakness unfortunately still present in Brazil and other developing countries with low tertiary education rate. In 2013, the percentage of teachers with tertiary education in Ceará's schools was around 72%. Although the rate was higher for the eligible ones, the averages were still below 80%, which is not a reasonable level in comparison, for instance, to most OECD countries where tertiary education is required to become a teacher (Education at a Glance 2019: OECD Indicators).

Ultimately, it seems that there are significant differences between the award and non-awarded schools and between supported and non-supported schools. Performing a basic test t, we find a significant difference at a 5% level between awarded and non-awarded only for the percentage of male students. However, there are significant differences at a 5% significance level for Average Socioeconomic Level, Urban, percentage of males, and the percentage of white between supported and non-supported schools. This is evidence that a simple comparison between both groups that receive the money transfers and those that did not would be misleading. Therefore,

to estimate the impact of the Escola Nota Dez's monetary grant requires a proper empirical strategy as we discuss in the next section.

## **5. Empirical Strategy**

We will explore the fact that the award or support of Escola Nota Dez is based on the IDE-5 rank to estimate the impact of the monetary grants in the schools' performance applying a Regression Discontinuity Design (RDD). Regression discontinuity design is a non-experimental evaluation arrangement that applies to a situation where treatment is determined by a threshold point in an observed variable, "forcing variable". As formalized by Imbens and Lemieux (2008) using Rubin's potential outcome framework, the RDD allows to estimate causal effects by using the results of individuals close to the cutoff point, but not in the treatment side, as counterfactual for those that received the intervention. The validity of this result requires continuity at the cutoff of all factors impacting the outcome except for the treatment assignment. In other words, the only difference between the left and the right of the neighborhood of the cutoff should be the assignment of the treatment. Applying to the Escola Dez's context, we can estimate the causal effect of the monetary grant by Regression Discontinuity Design, assuming that at the cutoff value of IDE to be assigned for the award or support the only difference between schools would be the money received. When it is well-founded, RDD has a strong internal validity when compared to other quasi-experimental methods (Nichols, 2007; Imbens and Lemieux; 2008). However, as the estimates are based on the subpopulation around the cutoff, the external validity is compromised, and we cannot extrapolate the results to the overall average effect.

Correa (2018) performed a parametric regression discontinuity design based on the basic model of Trochim (1990) to estimate the Escola Dez's impact assuming a linear relationship between the posttreatment outcomes and the pretreatment assignment variable (IDE-5) and applied binary variables to control for the eligibility rules of each type of intervention, award or support.

Alternatively, we follow a distinctive approach. Firstly, as there are two groups of intervention with different thresholds and different eligibility conditions for the comparison groups, award and support treatment is analyzed separately considering the two different datasets with only the eligible schools for the respective intervention. In that way, all schools above the award threshold and no schools below the award threshold receive the money, as well as all schools below the support cutoff and no school above the support cutoff, receive the grant. Therefore, we can estimate a “sharp” regression discontinuity for both cases. In a sharp RDD, the probability of being treated jumps from 0 to 1 at the cutoff. The alternative option would be a fuzzy RDD, where there is a significant but not total jump on the probability of being treated at the cutoff.

Furthermore, we estimate a nonparametric regression discontinuity instead of a parametric one. As the main limitation of the parametric design is the sensibility of the estimators for the choice of functional form between the outcome and treatment assignment, more recent literature has explored the possibility of nonparametric regression at the boundary to reduce this potential bias by comparing average outcome for small-enough bins of assignment variable to left and right of the cutoff (e.g: Hahn et al., 2001, Ludwig and Miller, 2007; Imbens and Lemieux, 2008; Angrist and Pischke, 2009). We employ a local linear regression for the schools within the optimal bin each side of the threshold as described in Imbens and Lemieux (2008) and Fan and Gibels (1996). We apply the methodological choices of Nichols (2007) both for the optimal bandwidth and kernel. The optimal bandwidth is estimated to minimize MSE as in Imbens and Kalyanaram (2009), and the triangle kernel that, as mentioned by Nichols, “has good properties in the RD context, due to being boundary optimal”. We test all the regressions for the bandwidth selection, as the sensibility of the estimators for the choice of the bandwidth is an issue of picking a nonparametric approach as an empirical strategy.

As our analysis is focused on the 2013 edition, the forcing variable is the IDE – 5 in 2013. The cutoff for the award is known pre-evaluation by the rules specified for the program (which is  $\text{IDE-5} = 7.5$ ), although this limit could be higher if more than 150 eligible schools achieve IDE greater than 7.5, it did not happen in 2013. On the other hand, the cutoff for the support is identified only after the number of awarded schools is known, based in the condition that the number of schools receiving the support must be the same number of schools being awarded and on the results of the different schools.

A reminder of the prize structure: schools were evaluated in the SPAECE 2013; awarded and supported schools are identified, and 1st installment of the monetary grant is received in 2014. The objective is to examine the impact of the money received in the Portuguese and Math proficiencies in SPAECE 2015, 2016, and 2017 and Prova Brasil 2015 and 2017. We estimate RDD for SPAECE and Prova Brasil 2013 proficiencies as robustness tests since we would expect no discontinuity pretreatment. There should be no discontinuity either in SPAECE 2014, at least not caused by the monetary grant, given the transfer occurs almost simultaneously to the exam by the end of the year. However, the announcement of the awarded and support schools made in March could have effects on the agents' incentives, so the estimation for SPAECE 2014 proficiencies is also an important robustness test.

Although covariates are not required to obtain consistent estimates, their inclusion could improve precision and reduce potential bias brought by observations not close enough to the cutoff (Imbens and Lemieux, 2008), therefore we performed all the regressions with and without covariates, including the pre-treatment dependent variable (SPAECE 2012 and Prova Brasil 2011), as suggested by Lee and Lemieux (2009).

Moreover, as demonstrated in table 5, several schools have received a monetary grant before 2013 either for the 2nd or 5th-grade version of the prize. Receiving money for previous

editions of the prize could potentially influence incentives and available resources of the schools. Therefore, we also estimate the effects of the award and support for 5th grade controlling for the numbers of times schools received money for previous editions of the program (both 2nd and 5th grade).

Table 5: Number of previous prizes received

Grade	N° Prizes	Eligible Award		Eligible Support	
		Yes (N = 95)	No (N = 463)	Yes (N = 95)	No (N = 1624)
2nd	0	19	252	40	888
	1	36	132	38	510
	2	21	55	14	164
	4	15	17	1	50
	5	4	7	1	12
5th	0	54	432	79	1524
	1	41	31	15	100

Notes: Author's Elaboration. Number of prizes considers both classes of monetary grant (award and support). The Escola Nota Dez prize started for 2nd grade in 2009 and for 5th grade in 2011.

A concern before applying regression discontinuity design is that the only change at the cutoff is the assignment for the treatment. In other words, we expect no discontinuity in other baseline characteristics, since the only difference in the schools immediately above and below the threshold should be the receiving of the prize. To test for this assumption, we ran RDDs using covariates as outcome variables and analyzed if there was a significant jump at the cutoff on the award dataset and support data set. We did not find significant discontinuity in any of the regression as described in table 6. Appendix B presents RD graphs of the covariates on assignment variable (IDE) and tests for the sensibility of the bandwidth.

Table 6: RDD with covariates as outcomes

Baseline Variables	Award Cutoff = 7.5		Support Cutoff = 2.45	
	Coefficient	s.d.	Coefficient	s.d.
Average Socioeconomic Index	-0.17	(0.91)	0.60	(0.51)
Urban area	0.02	(0.16)	0.17	(0.11)
% Male students	-0.01	(0.02)	0.00	(0.01)
% Brown students	-0.03	(0.07)	0.01	(0.04)
% White students	0.00	(0.05)	0.00	(0.02)
% Teachers with Tertiary Education	-0.01	(0.08)	0.04	(0.04)

Notes: Tables reports local linear coefficients and standard errors using the optimal bandwidth that minimize MSE

\*Significant at 10% \*\*Significant at 5% \*\*\*Significant at 1%

Another concern for the estimation may be the possibility of schools around the threshold manipulate their results to receive the treatment. It is hard to believe that schools could manipulate the IDE, given that it is calculated based on the average proficiencies of the exam result of the many students in the schools, then also in the participation rates and other educational indicators as mentioned before. Besides, the threshold for supported schools is previously unknown, and even for awarded schools what is known is the minimum necessary value (7.5). Manipulation would be even more difficult for the support ones that would necessarily jeopardize their performance to get the money. We tested the manipulation assumption by comparing the density of the forcing variable on the left and right of the threshold, as proposed by McCrary (2008). As expected, we could not reject the null hypothesis of no jumps at the cutoff for both interventions (the difference between the frequency to the right and the left for the award dataset is 0.2 with standard errors equal to 0.54, and for the support dataset the difference is -0.02 and standard errors 0.13). Figure 1 shows the distribution of IDE-5 2013 for the schools eligible for the awarded and support about the respective cutoff

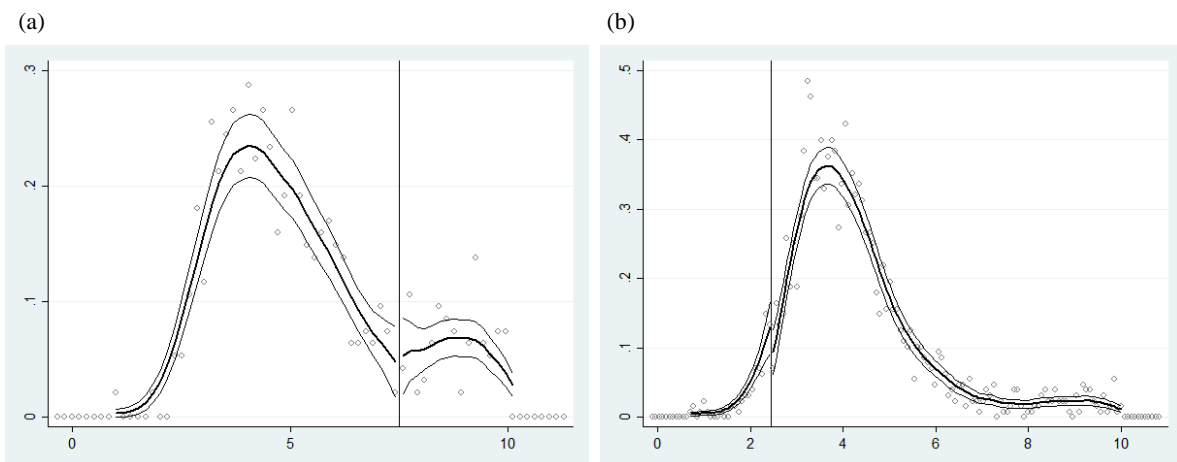


Figure 1. Distribution of IDE-5 2013 in relation to the cutoff. (a) Distribution of the IDE-5 2013 for schools eligible for the award in relation to the award cutoff. (b) Distribution of the IDE-5 2013 for schools eligible for the support in relation to the support cutoff. Notes: The density function was calculated using McCrary (2008) test for manipulation in regression discontinuity design.

## 6. Results

Table 7 reports the causal effects of Escola Nota Dez's prize on Math and Portuguese proficiencies of 5th grade SPAECE and Prova Brasil of schools that received the monetary grants for 5th grade in 2013. The estimations were made by local linear regression discontinuity without covariates, with covariates and with covariates plus controls for the previous edition of the prize. Those estimates for the award intervention are displayed in the columns (1), (2) and (3) and for the support one in the columns (4), (5) and (6).

Table 7: Causal Effects of Escola Nota Dez award on Math and Portuguese proficiencies for Awarded and Supported schools

	Award						Support					
	(1) RD		(2) RD with covariates		(3) RD with previous prize controls		(4) RD		(5) RD with covariates		(6) RD with previous prize controls	
	Portuguese	Math	Portuguese	Math	Portuguese	Math	Portuguese	Math	Portuguese	Math	Portuguese	Math
SPAECE												
2017	-6.74 (12.90)	-11.15 (14.32)	-5.94 (11.62)	-9.94 (13.83)	-5.80 (11.59)	-10.41 (13.78)	-5.13 (4.48)	-3.00 (6.37)	-7.49* (4.22)	-4.81 (6.47)	-7.53* (4.22)	-4.78 (6.48)
2016	-0.20 (6.84)	-4.57 (7.36)	2.39 (6.72)	-1.85 (7.68)	2.37 (6.74)	-1.93 (7.72)	-2.45 (3.67)	-0.48 (4.36)	-3.00 (3.65)	-1.38 (4.29)	-3.12 (3.69)	-1.41 (4.27)
2015	9.46 (7.90)	1.43 (8.28)	11.28 (7.38)	2.91 (8.02)	11.26 (7.32)	2.76 (7.92)	-3.85 (4.39)	0.94 (5.11)	-4.81 (4.44)	-0.10 (4.74)	-4.80 (4.43)	0.03 (4.69)
2014	10.37 (7.32)	21.13** (9.47)	13.39* (7.03)	22.27** (9.44)	13.25* (7.10)	22.09** (9.23)	-5.92 (3.63)	-4.43 (4.11)	-3.89 (3.34)	-4.21 (3.80)	-3.99 (3.29)	-4.21 (3.78)
2013	-4.48 (4.03)	1.91 (3.06)	-4.08 (3.14)	1.98 (3.11)	-4.05 (3.14)	1.99 (3.10)	-1.90 (0.96)	0.79 (0.95)	-1.65* (0.96)	0.42 (0.95)	-1.64* (0.95)	0.39 (0.94)
Prova Brasil												
2017	-7.51 (10.26)	-10.76 (13.72)	10.72* (6.00)	9.60 (8.12)	-7.11 (9.34)	-10.16 (11.33)	1.74 (4.38)	-2.97 (5.18)	0.29 (4.75)	-4.79 (5.74)	0.59 (4.38)	-4.25 (5.20)
2015	-14.42 (10.52)	-12.28 (11.98)	6.66 (8.59)	9.48 (8.64)	-12.21 (9.18)	-10.18 (10.44)	-0.82 (3.77)	2.56 (3.59)	-0.98 (3.79)	0.98 (3.83)	-2.07 (3.77)	1.72 (3.53)
2013	3.35 (6.69)	3.16 (7.53)	6.29 (7.10)	6.02 (7.15)	1.36 (5.47)	1.48 (6.58)	-2.34 (3.64)	0.80 (4.37)	0.29 (2.24)	3.66 (2.74)	0.94 (2.06)	4.14 (2.53)

Notes: Table reports local linear RDD coefficients and standard errors from school-level regressions using the optimal bandwidth that minimizes MSE and a triangle kernel distribution. (1) to (3) are the causal effects for the award. (4) to (6) are the causal effects for the support. Except for (1) and (4), estimations used covariates: Average Socioeconomic Level, Urban Area, Percentage of Male, Percentage of Brown, Percentage of White, Percentage of Teachers with Tertiary Education and Math/ Portuguese grades in 2012 for SPAECE estimations and Math/Portuguese grades in 2011 for Prova Brasil estimations. Estimations (3) and (6) used previous prize control, which is the number of the prize received before 2013 considering both 2nd grade, 5th grade, award, and support. \*Significant at 10% \*\*Significant at 5% \*\*\*Significant at 1%

Regarding the award, there is no significant impact of the award both for Portuguese and Math SPAECE for any of the years, except 2014, and the results are quite consistent between the different approaches. For 2014, we found positive effects in the Math SPAECE grade at a 5% significance level and in Portuguese SPAECE grade for the estimations with controls presented in columns (2) and (3), but only at a 10% significance level. Considering that the resources for the

2013 edition were received by the end of 2014, these effects could not be from the monetary grant. A possible explanation for the impact in 2014 could be that the acknowledgment of the school as one of the best of the state might motivate teachers and students in the following year of the award announcement, although we cannot confirm this hypothesis with the available data. The award seems to have no impact in Prova Brasil's proficiencies neither. Although the estimation with covariates suggests effect in Portuguese in 2017, the result is only significant at the 10% level and it is not robust compared to other estimation procedures. Appendix C shows the regression discontinuity graphs for the award dataset.

Concerning the supported schools, there is no significant effect for any of the years in both SPAECE and Prova Brasil at a 5% significance level. Yet, at a 10% significance level, the estimations with covariates suggest an impact in the Portuguese SPAECE in 2013 and 2017. Appendix D shows the regression discontinuity graphs for the support dataset.

Moreover, as presented in Appendix E, we test the bandwidth sensibility of the estimation by displaying coefficients and confidence interval for bins smaller and larger than the optimal bandwidth and the results are robust for bandwidth choice.

## **7. Discussion and Conclusion**

We use the evidence from the innovative Escola Nota Dez prize implemented in the Brazilian state Ceará to address the question of whether offering extra resources to schools is an effective instrument to improve their performance. Every year, this program gives monetary grants to the best and worst public schools according to a standardized index for 2nd, 5th, and 9th grade of the elementary basic education and some eligibility rules. Our analysis focused on the schools awarded or supported for 5th grade in 2013 and our results indicate that the monetary dimension of the prize had no impact on schools' achievements in terms of proficiencies when we compared



schools that received extra resources to their counterfactual estimated using a sharp regression discontinuity approach.

As discussed in section 3, the effectiveness of extra resources as an instrument of policy in education is an ongoing debate, hence the estimated absence of impact of the monetary grants is indeed coherent to several works in the literature, such as Hanushek (1981, 1989 and 2008) and Glewwe et al. (2011). Looking at the research on Escola Nota Dez, previous works had shown positive effects of being awarded by the Escola Nota Dez prize, and ambiguous results for being supported (Koslinski et al., 2017; Carneiro, 2018; Correa, 2018). However, the authors have examined the program as evidence of school accountability, which means they were focused on evaluating the whole system of standardized tests or procedures, employing criteria to determine whether schools perform satisfactorily or unsatisfactorily. In this sense, they did not control for the timeline of the prize, that is, if the schools had already received the money or not. Our results for the award indicate some effects on SPAECE 2014 (when they had not received any money), that could come from other incentives created by the prize, such as the motivation and competition. The RDD analysis of Correa (2018), for instance, also found a positive impact of the award in a moment previous of receiving the monetary grant.

Although the monetary dimension of the prize might not be effective, the Escola Nota Dez is also part of a set of policies of school accountability. It is reasonable to suppose that accountability influences schools regardless they received or did not receive a contribution. Literature had shown consistently positive effects of PAIC and Escola Nota Dez when comparing the performance of Ceará's schools to schools from other Brazilian states, such as Lavor and Arraes (2014), Costa and Carnoy (2014), Karminski et al. (2017) and Carneiro (2018).

Our analysis did not explore how the schools allocated the money according to the program's guidelines, the impact of the money being transferred in two installments or the

relationship with the pedagogical-technical cooperation, those are interesting questions for further investigation. As Hanushek (2006) remarks, even new evidence and stronger methodology are improbable to bring a definitive conclusion about the general effectiveness of resources, yet, it is valuable the learning of when and where resources are productively applied in education.

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## Appendix A: IDE calculation

The gross IDE is calculated based on the proficiencies in Portuguese and Math from SPAECE (1) – Portuguese acronym for Basic Education Permanent Evaluation System of Ceará, a census and external evaluation promoted every year since 1992 for students on 2nd, 5th and 9th grade of public elementary schools. Those proficiencies are on a scale from 0 – 500 with inferior and superior limits pre-determined depending on the grade evaluated. However, the Escola Nota Dez uses, in fact, the IDE-Alfa, IDE-5 and IDE -9, the indicators for 2nd, 5th and 9th grade respectively, computed using the Gross IDE, the percentage of participation in the exam and an adjustment factor for universal learning (2), those components are strategically included to discourage schools to use a method of students selection to improve performance.

$$Gross\ IDE = \frac{SPAECE\ Proficiency - Inferior\ Limit}{Superior\ Limit - Inferior\ Limit} \times 10 \quad (1)$$

$$IDE - Alfa, 5, 9 = IDE\ bruto \times Participation\ rate \times Adjustment\ factor \quad (2)$$

## Appendix B: RDD robustness tests - Baseline characteristics as outcomes

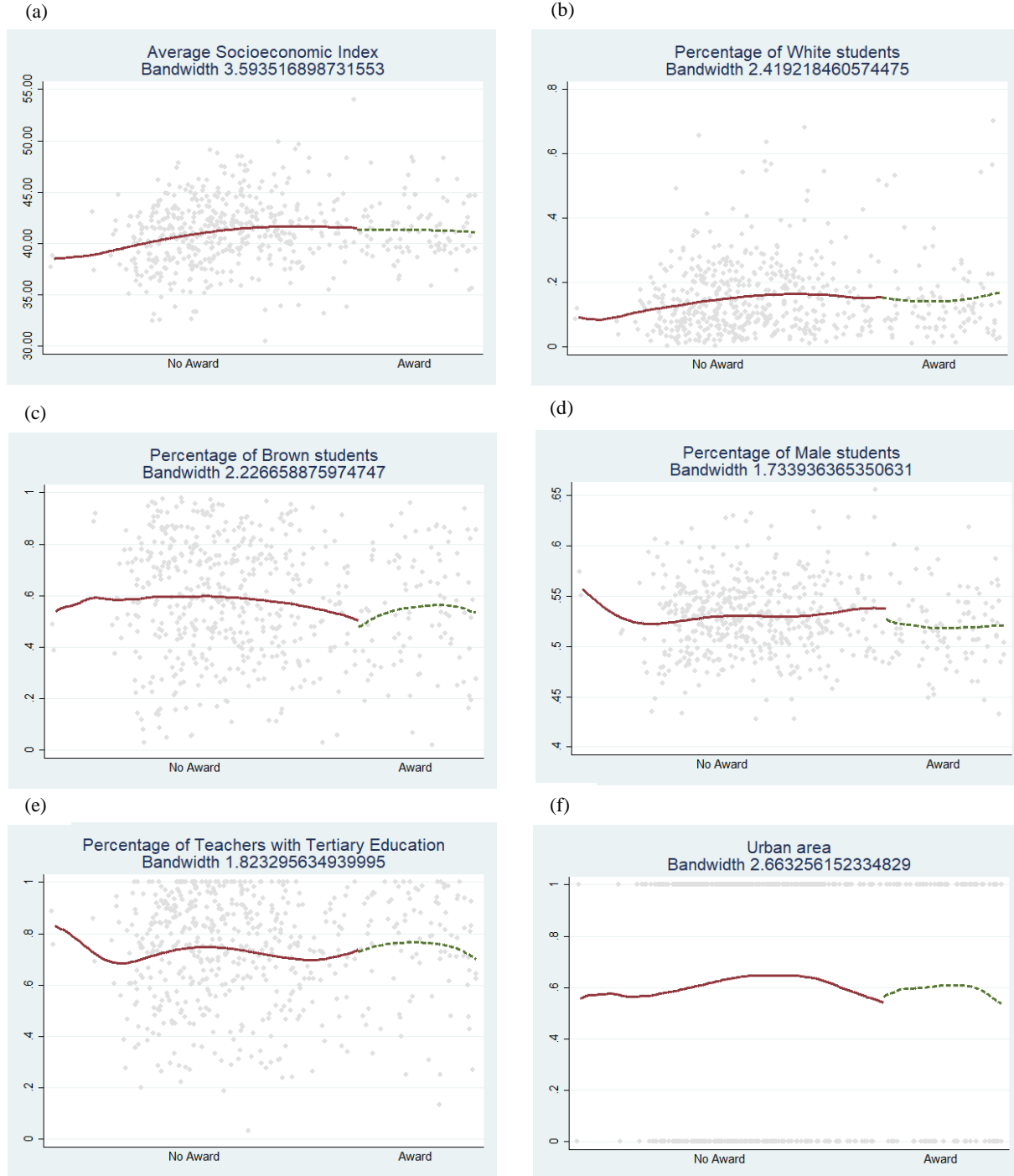


Figure B.1. Award Dataset: baseline characteristics as outcomes in relation to the award cutoff. Red line for non-awarded schools and Green line for awarded schools with the optimal bandwidth that minimize MSE and a triangle kernel distribution. (a) Average Socioeconomic Level (b) Percentage of White (c) Percentage of Brown (d) Percentage of Male (e) Percentage of Teachers with Tertiary Education (f) School is in Urban Area



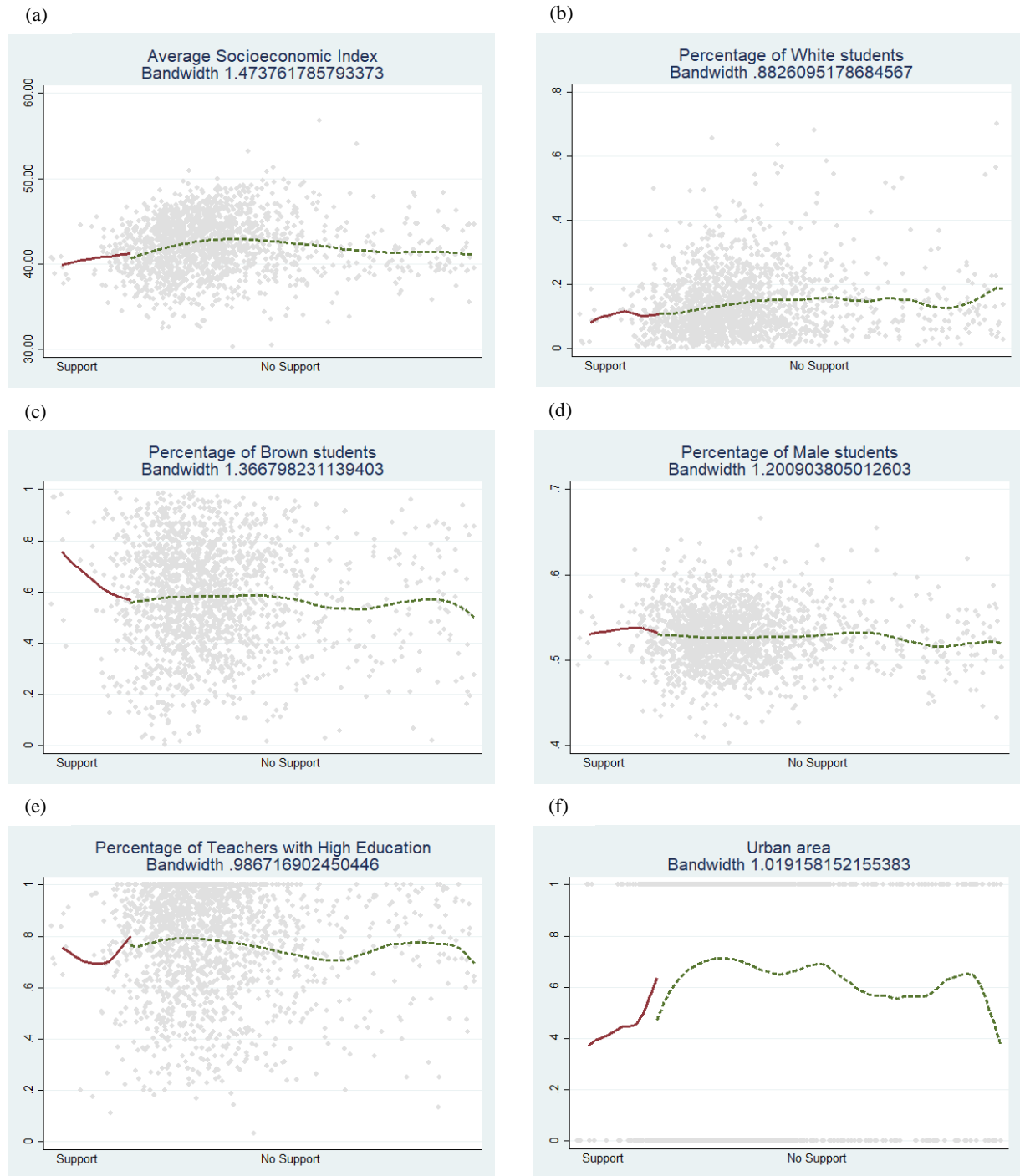


Figure B.2 Support Dataset: baseline characteristics as outcomes in relation to the support cutoff. Notes: Red line for supported schools and Green line for non-supported schools with the optimal bandwidth that minimize MSE and a triangle kernel distribution. (a) Average Socioeconomic Level (b) Percentage of White (c) Percentage of Brown (d) Percentage of Male (e) Percentage of Teachers with Tertiary Education (f) School is in Urban Area

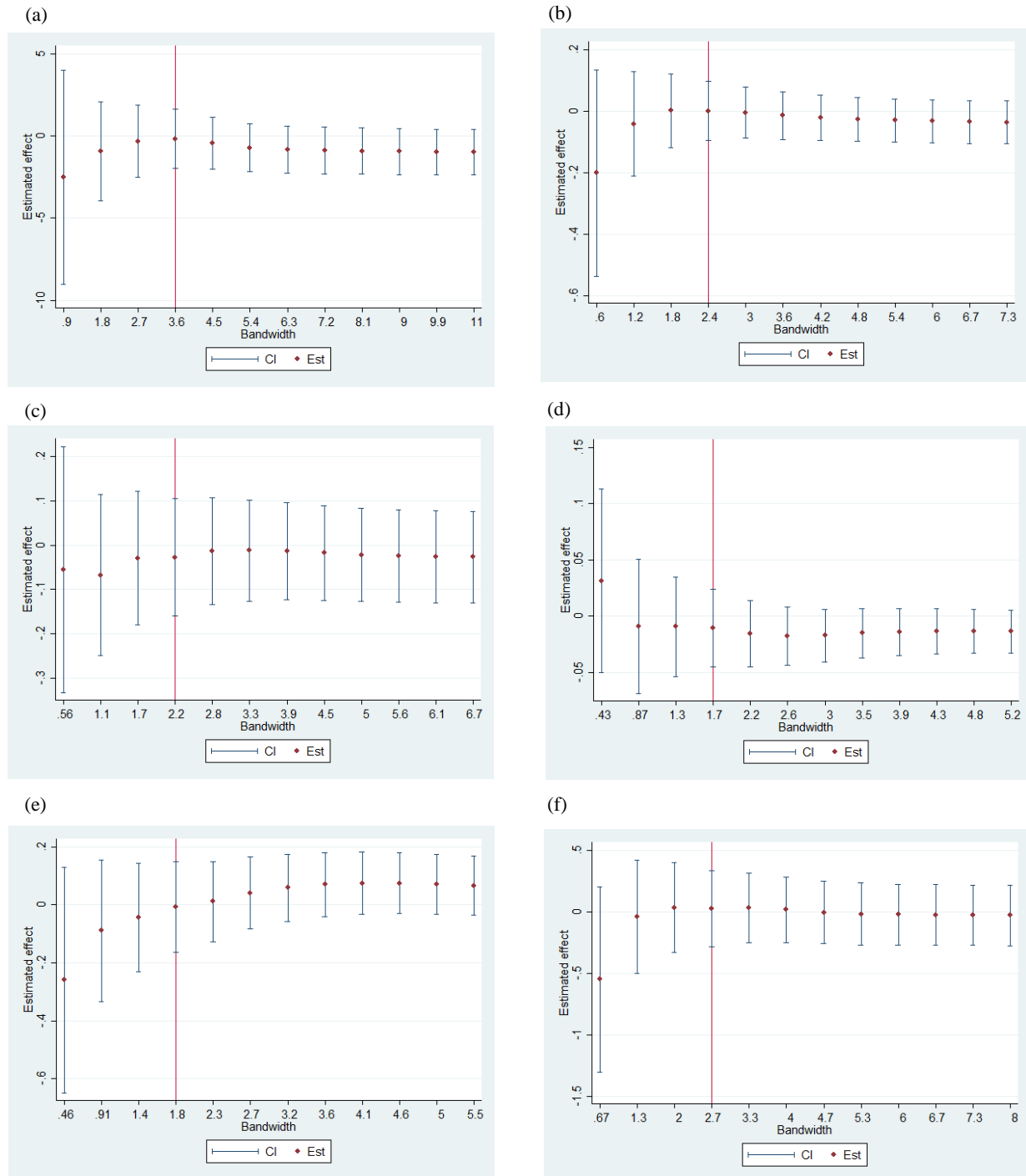


Figure B.3. Award Dataset: graph of estimates versus bandwidths for baseline characteristics as outcomes in relation to Award cutoff. Notes: Estimates as red dot and 95% confidence interval as blue bracket. The vertical red line represents the default bandwidth. (a) Average Socioeconomic Level (b) Percentage of White (c) Percentage of Brown (d) Percentage of Male (e) Percentage of Teachers with Tertiary Education (f) School is in

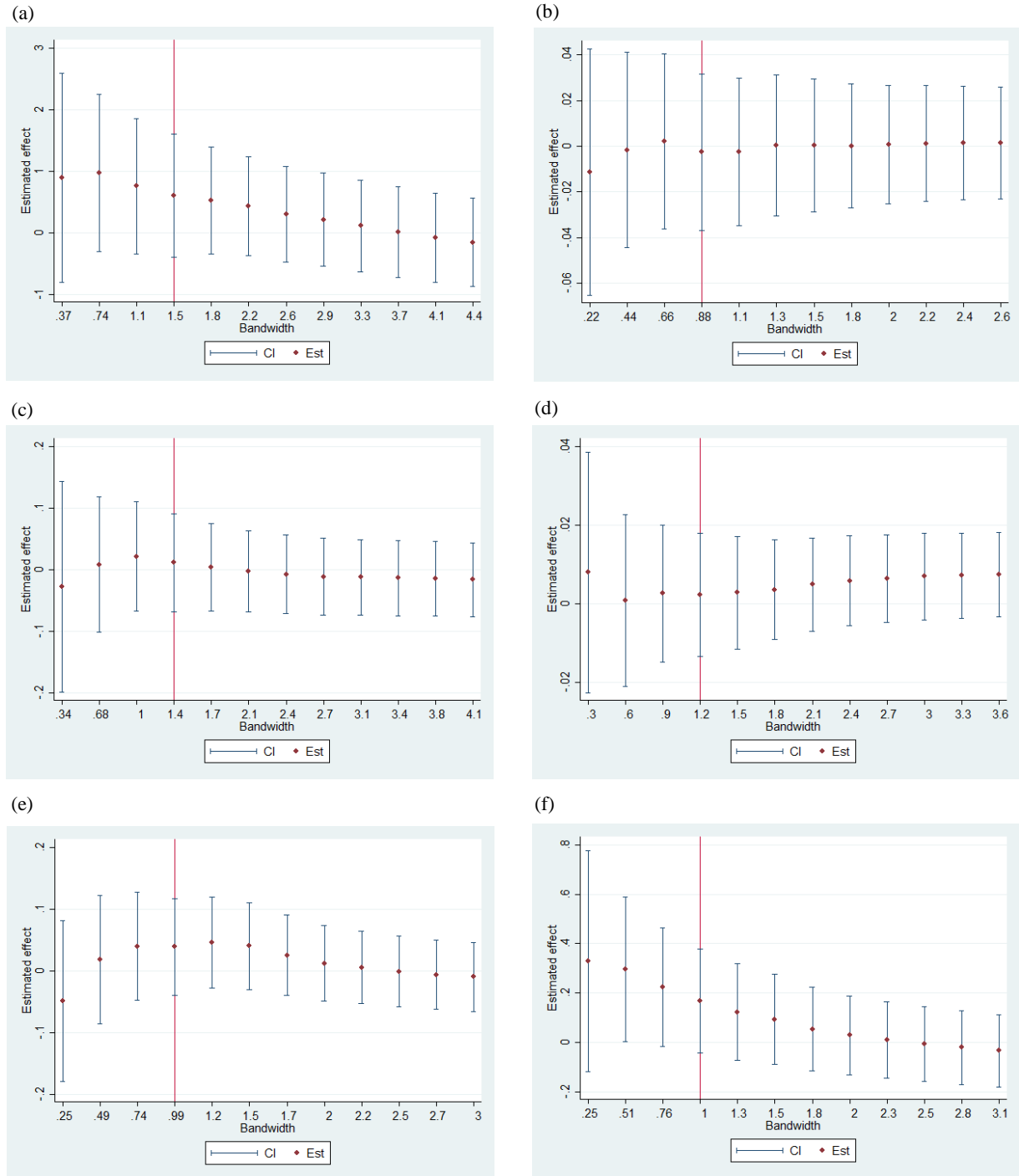
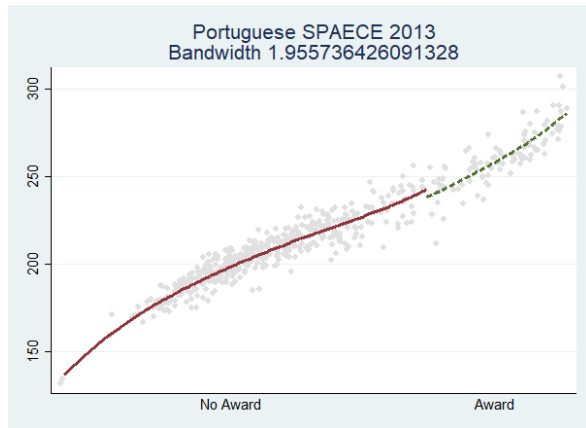


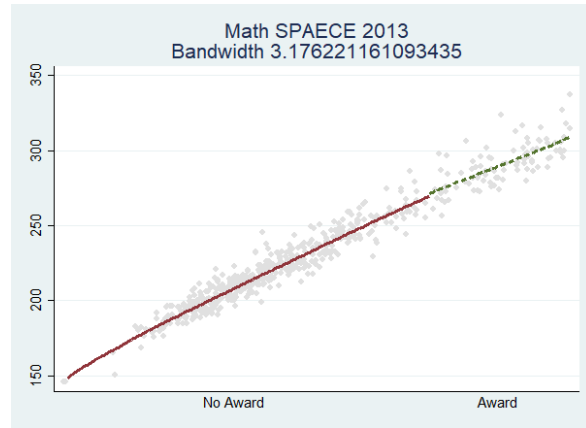
Figure B.4. Support Dataset: graph of estimates versus bandwidths for baseline characteristics as outcomes in relation to Support cutoff. Notes: Estimates as red dots and 95% confidence interval as blue brackets. The vertical red line represents the default bandwidth. (a) Average Socioeconomic Level (b) Percentage of White (c) Percentage of Brown (d) Percentage of Male (e) Percentage of Teachers with Tertiary Education (f) School is in

## Appendix C: Award – Regression Discontinuity Graphs

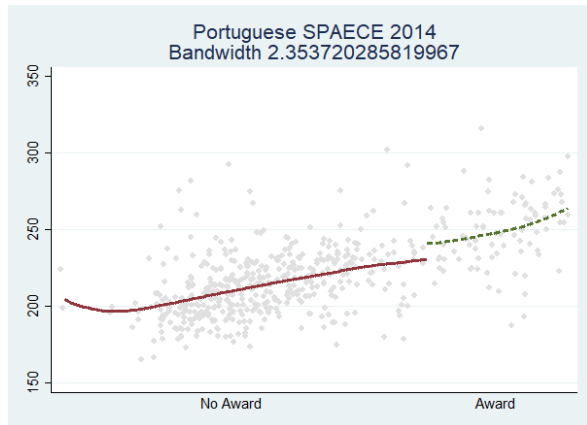
(a)



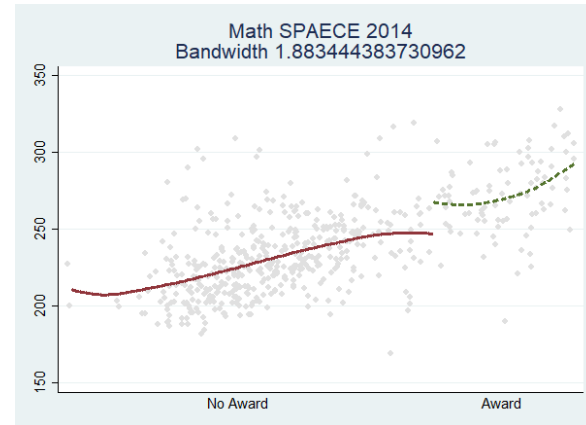
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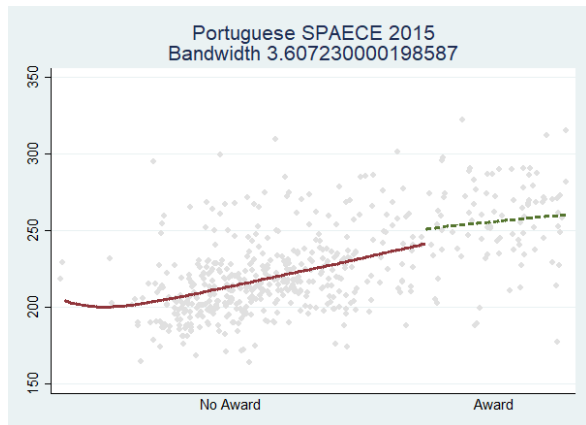
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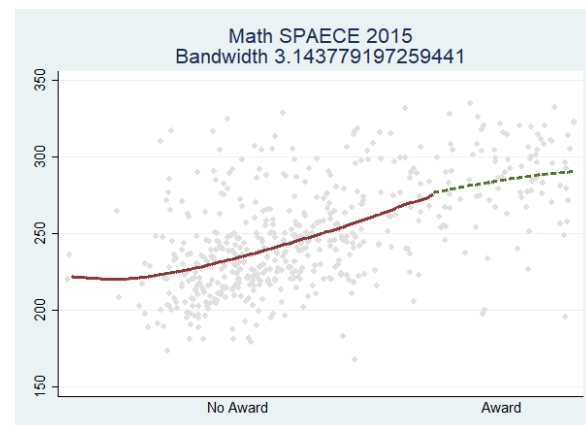
(d)



(e)



(f)



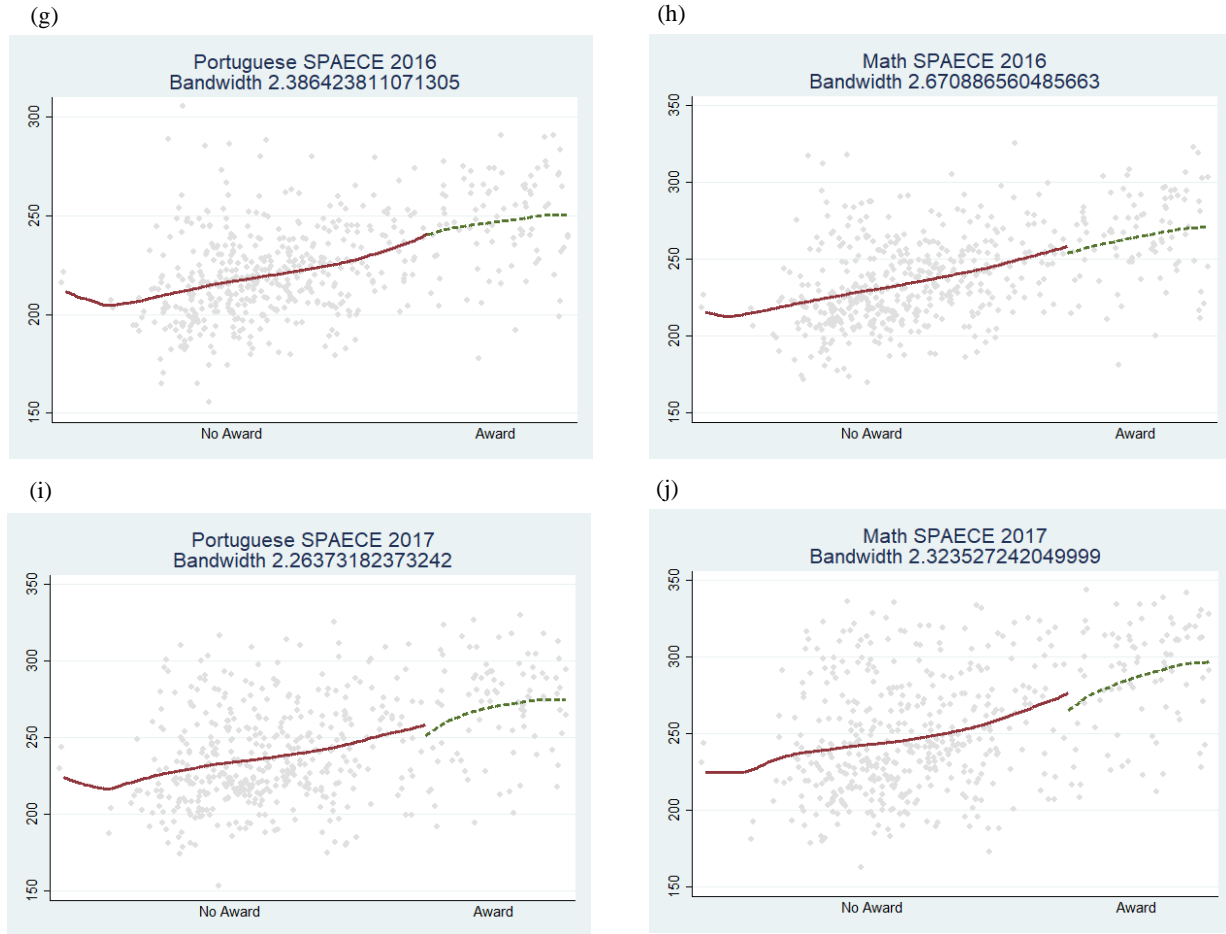


Figure C.1. Award – Regression Discontinuity graphs with SPAECE proficiencies as outcomes. Red line for non-awarded schools and Green line for awarded schools with the optimal bandwidth that minimize MSE and a triangle kernel distribution (a) Portuguese 2013 (b) Math 2013 (c) Portuguese 2014 (d) Math 2014 (e) Portuguese 2015 (f) Math 2015 (g) Portuguese 2016 (h) Math 2016 (i) Portuguese 2017 (j) Math 2017

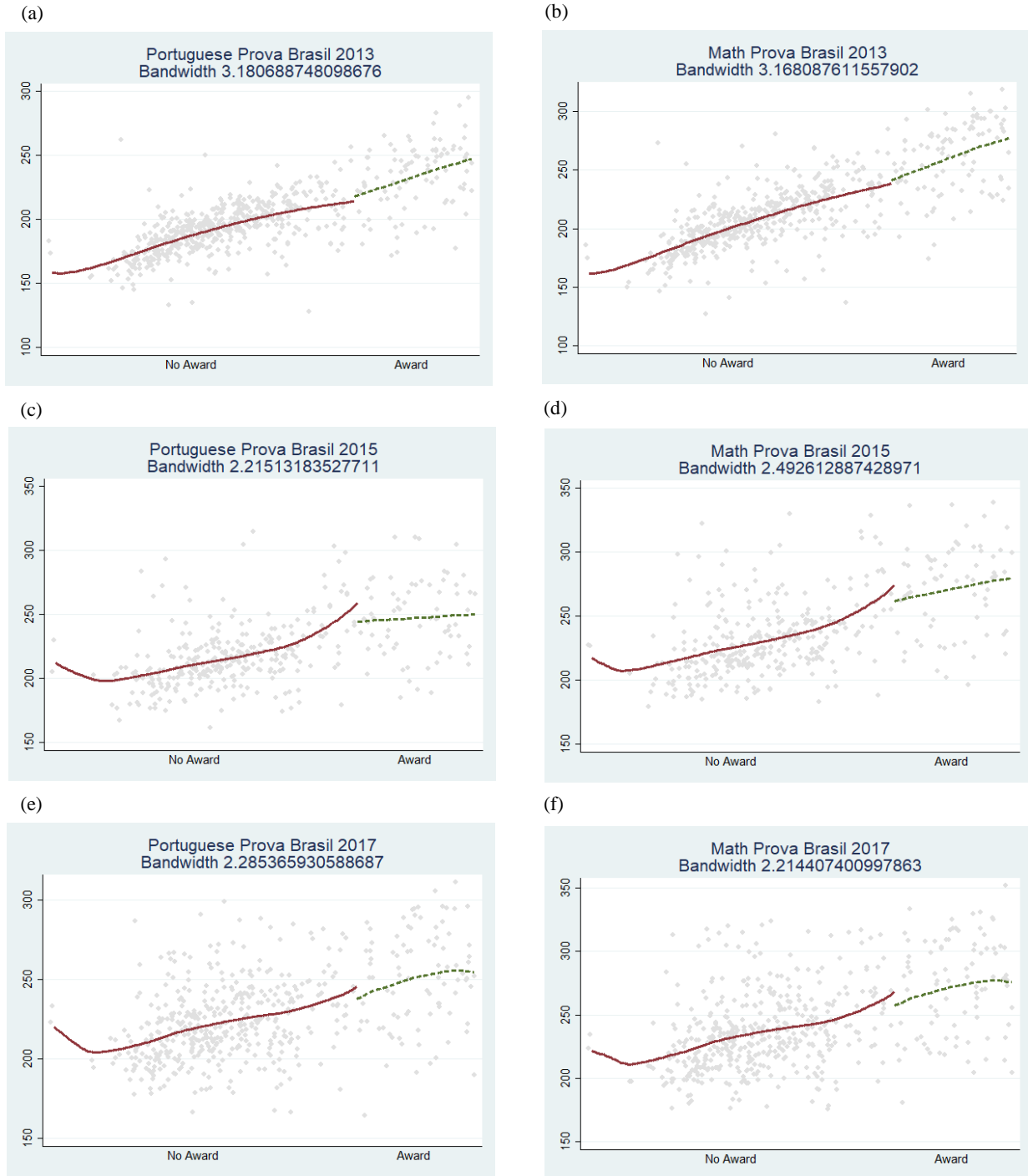
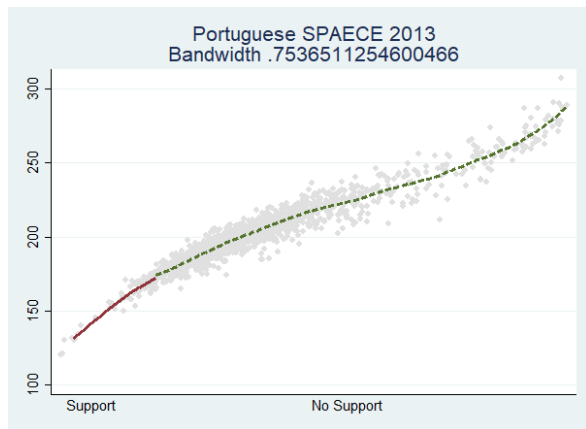


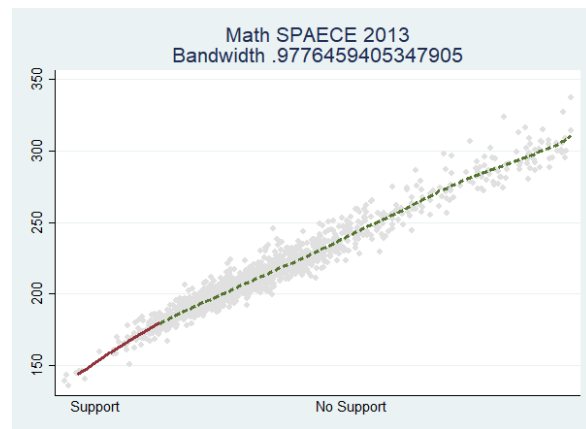
Figure C.2. Award – Regression Discontinuity graphs with Prova Brasil proficiencies as outcomes. Red line for non-awarded schools and Green line for awarded schools with the optimal bandwidth that minimize MSE and a triangle kernel distribution (a) Portuguese 2013 (b) Math 2013 (c) Portuguese 2015 (d) Math 2015 (e) Portuguese 2017 (f) Math 2017

## Appendix D: Support – Regression Discontinuity Graphs

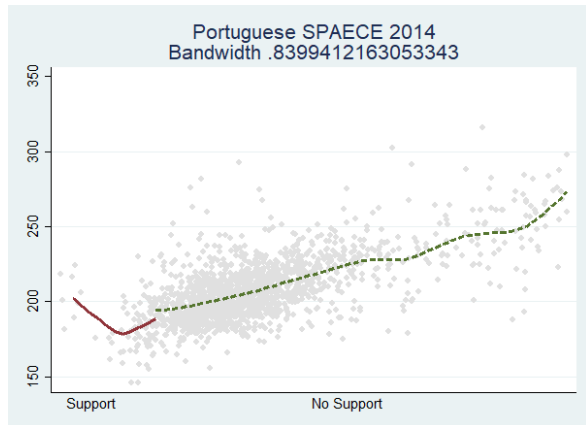
(a)



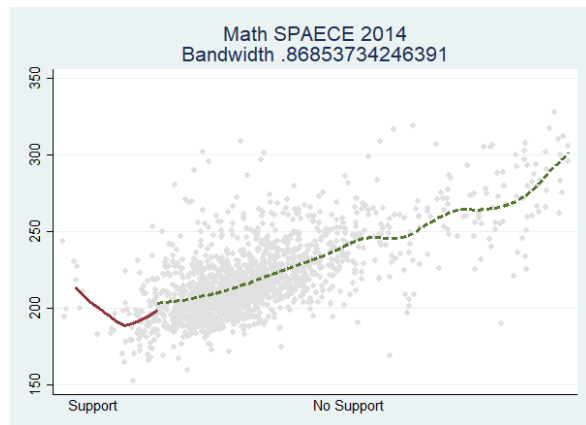
(b)



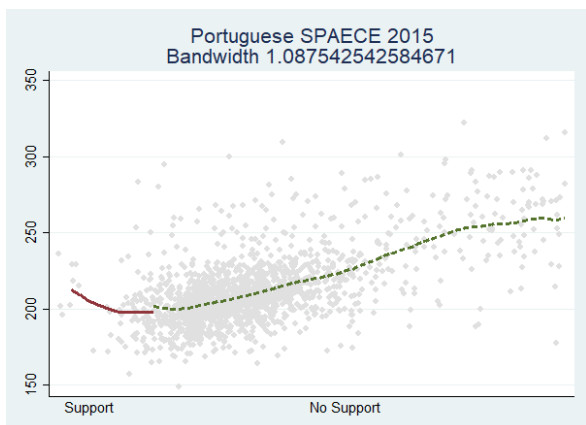
(c)



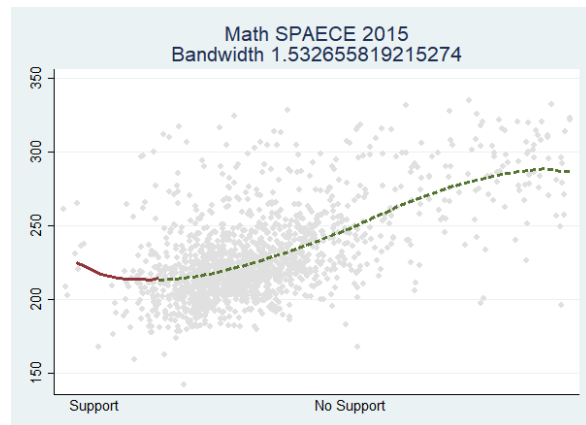
(d)



(e)



(f)



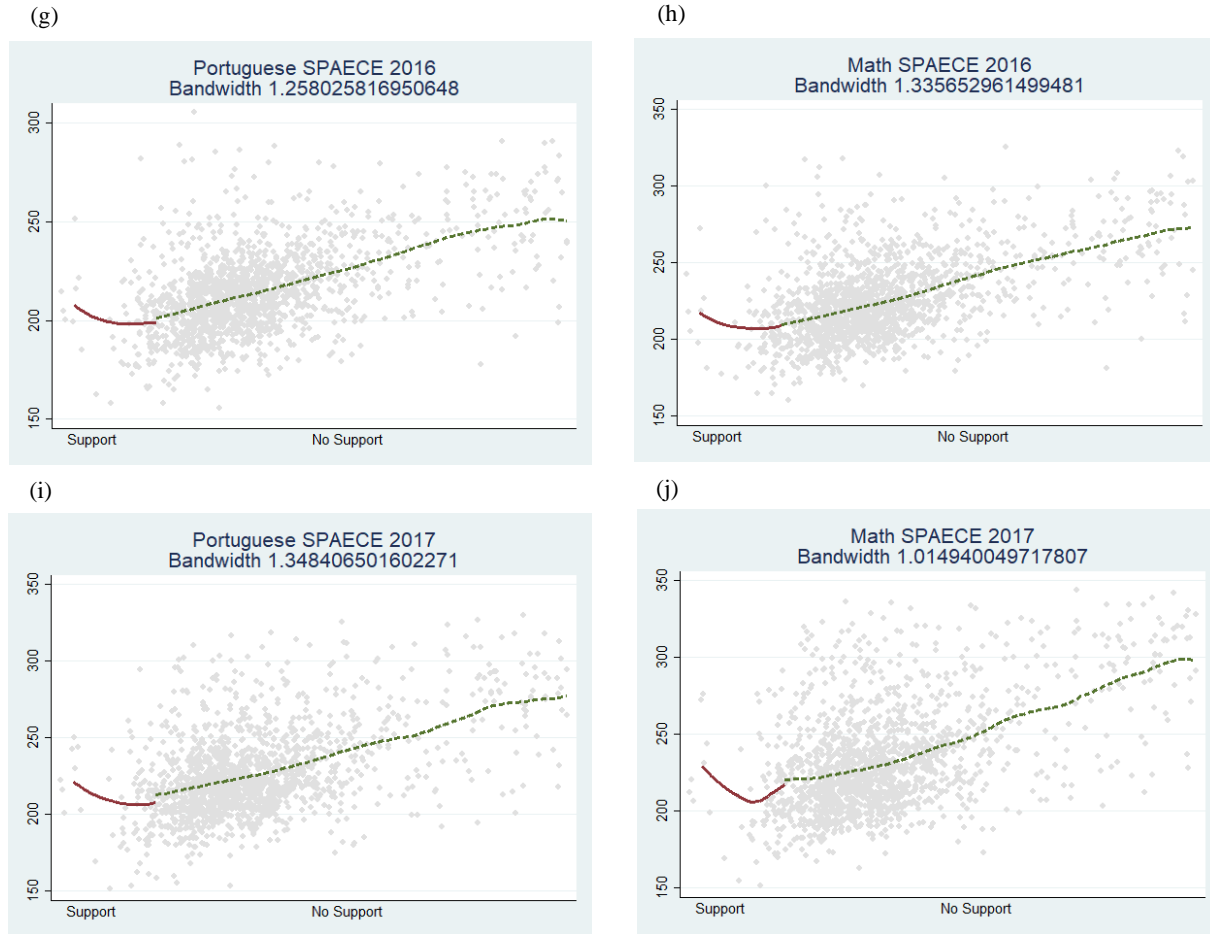


Figure D.1 Support – Regression Discontinuity graphs with SPAECE proficiencies as outcomes. Red line for non-awarded schools and Red line for supported schools and Green line for non-supported schools with the optimal bandwidth that minimize MSE and a triangle kernel distribution. (a) Portuguese 2013 (b) Math 2013 (c) Portuguese 2014 (d) Math 2014 (e) Portuguese 2015 (f) Math 2015 (g) Portuguese 2016 (h) Math 2016 (i)



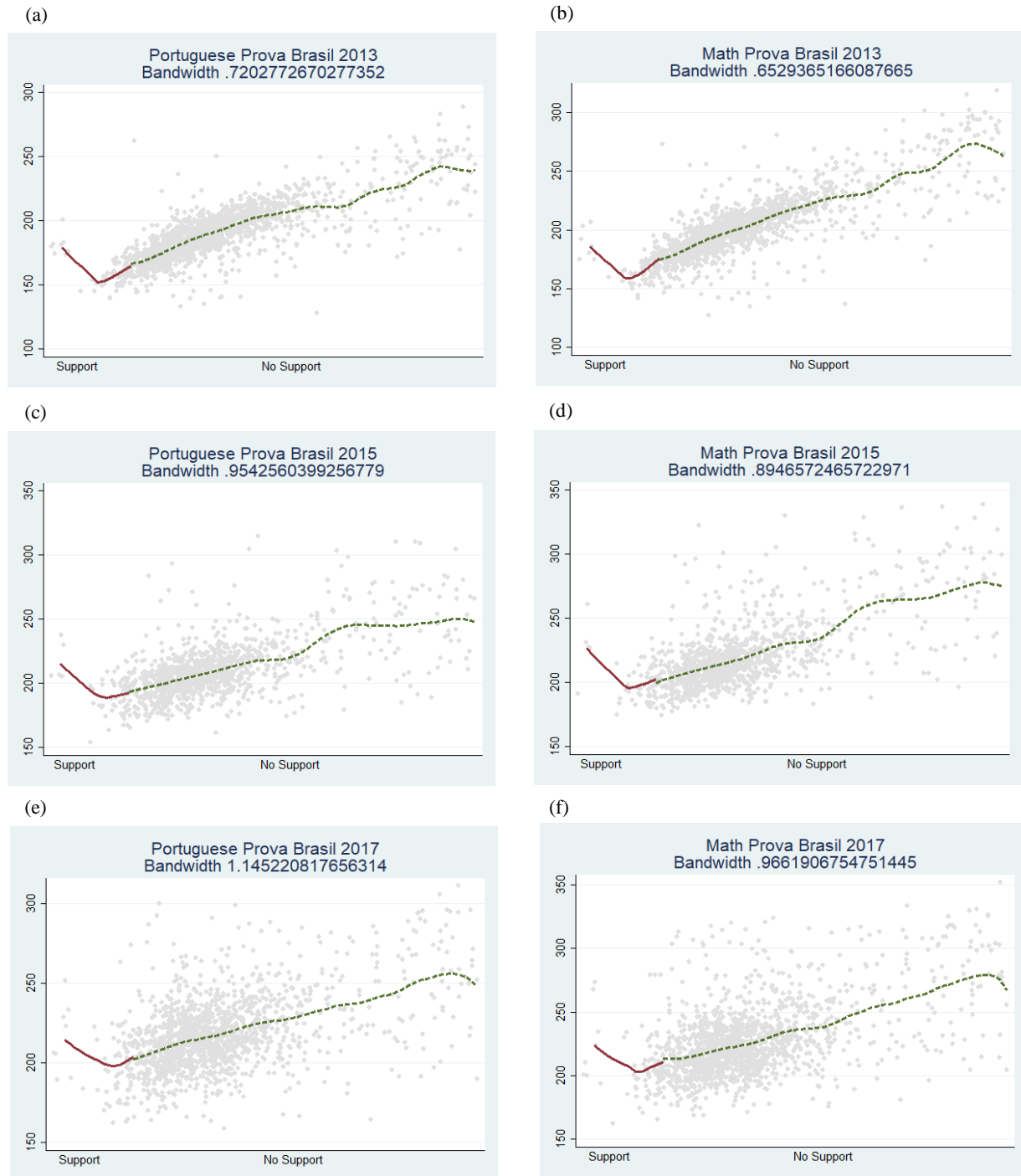


Figure D.2. Support – Regression Discontinuity graphs with Prova Brasil proficiencies as outcomes Red line for supported schools and Green line for non-supported schools with the optimal bandwidth that minimize MSE and a triangle kernel distribution. (a) Portuguese 2013 (b) Math 2013 (c) Portuguese 2015 (d) Math 2015 (e) Portuguese 2017 (f) Math 2017

## Appendix E: Bandwidth Sensibility Tests

Table E.1: Awarded Schools - P-value under the null hypothesis of  $\beta = 0$  for different bandwidth choices

	SPAECE						Prova Brasil					
	2017		2016		2015		2014		2013		2017	
	Port	Math	Port	Math	Port	Math	Port	Math	Port	Math	Port	Math
Optimal	60%	44%	98%	53%	23%	86%	16%	3%	27%	53%	46%	43%
25%	0%	1%	0%	11%	55%	79%	86%	39%	35%	43%	2%	1%
50%	87%	63%	94%	70%	44%	86%	31%	28%	24%	75%	87%	91%
75%	60%	43%	87%	41%	34%	92%	13%	3%	31%	78%	55%	47%
125%	82%	62%	71%	66%	19%	74%	20%	6%	28%	51%	78%	70%
150%	94%	72%	52%	79%	19%	64%	23%	12%	20%	45%	100%	99%
175%	94%	89%	36%	91%	18%	55%	24%	15%	15%	41%	90%	87%
200%	83%	97%	29%	97%	17%	50%	26%	20%	11%	37%	85%	76%
225%	77%	86%	27%	100%	16%	47%	28%	26%	8%	33%	85%	75%
250%	74%	80%	26%	98%	15%	44%	30%	30%	5%	30%	86%	74%
275%	72%	77%	25%	96%	15%	42%	32%	33%	3%	28%	87%	74%
300%	71%	74%	24%	95%	15%	41%	32%	36%	2%	26%	86%	74%

Notes: Table reports the p-value under the  $H_0: \beta = 0$  for the local linear RDD coefficients from school-level regressions using the different choice of bandwidth as variation in percentage of the optimal bandwidth that minimizes MSE.

Table E.2: Supported Schools - P-value under the null hypothesis of  $\beta = 0$  for different bandwidth choices

	SPAECE						Prova Brasil					
	2017		2016		2015		2014		2013		2017	
	Port	Math	Port	Math	Port	Math	Port	Math	Port	Math	Port	Math
Optimal	25%	64%	51%	91%	38%	85%	10%	28%	5%	41%	69%	57%
25%	100%	22%	99%	38%	85%	94%	66%	2%	34%	79%	14%	4%
50%	37%	57%	39%	98%	27%	52%	31%	100%	7%	18%	68%	78%
75%	17%	91%	43%	87%	21%	74%	12%	34%	2%	21%	77%	59%
125%	17%	73%	59%	94%	70%	86%	13%	25%	9%	71%	65%	76%
150%	8%	79%	44%	74%	78%	80%	14%	22%	15%	77%	87%	98%
175%	5%	51%	32%	61%	77%	71%	10%	15%	19%	77%	50%	72%
200%	4%	34%	26%	54%	78%	62%	3%	5%	18%	80%	30%	52%
225%	4%	27%	23%	52%	81%	54%	1%	2%	20%	86%	21%	40%
250%	3%	24%	22%	54%	86%	48%	0%	2%	22%	84%	18%	34%
275%	3%	24%	21%	55%	92%	43%	0%	2%	18%	84%	17%	32%
300%	3%	25%	20%	56%	97%	38%	0%	2%	13%	89%	16%	32%

Notes: Table reports the p-value under the  $H_0: \beta = 0$  for the local linear RDD coefficients from school-level regressions using the different choice of bandwidth as variation in percentage of the optimal bandwidth that minimizes MSE.